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SOUTHWEST FISHERIES CENTER

NATIONAL MARINE FISHERIES SERVICE HONOLULU LABORATORY 2570 DOLE STREET HONOLULU, HAWAII 96822-2396

May 1991

Southwest Fisheries Science Center and Southwest Region Economics Research Plan, 1990-95

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ADMINISTRATIVE REPORT H-91-07

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Administrative Report H-91-07

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NOT FOR PUBLICATION

INTRODUCTION

This report identifies priorities for the 1990-95 period in the collaborative economics research efforts of the Southwest Fisheries Science Center and Southwest Region (SWFSC-SWR) economists under the jointly administered socioeconomics research fund. The socioeconomics fund originated with the implementation of the Magnuson Fishery Conservation and Management Act (MFCMA). The purpose of the fund was to augment the research capacity of the newly formed economics research components at the regional level. The fund assists SWFSC-SWR economists by providing project funds for high-priority economics research initiatives. Annually (usually in the summer) the SWFSC-SWR economists meet to propose projects for the forthcoming fiscal year, and these proposals are submitted to the SWFSC-SWR Directors for approval. The research fund is administered in the Coastal Division of the SWFSC La Jolla Laboratory. Recent economics research activities supported by the fund are contained in its 1990 annual report (Silverthorne and Jacobson, 1991).

In 1979, the SWFSC-SWR economists developed a long-term economics *data collection* plan as overall program guidance for socioeconomics research. In 1982 the economists decided that emphasis on *research,* rather than data collection *per se*, was the proper direction for the allocation of the economics research fund. This report updates that decision and represents a thorough reevaluation of economics research directions into the 1990s for the SWFSC-SWR.

This plan was initiated at a regular semiannual meeting of the SWFSC-SWR economists held in La Jolla on 12-13 December 1989. At that meeting the economists reviewed the important issues facing the SWFSC-SWR that might require economics analysis, reviewed the basic economics methodologies employed in fisheries research, and outlined a long-term strategy for addressing the priorities. The plan was reviewed by the SWFSC-SWR economists in May and December 1990 and subsequently submitted to the SWFSC-SWR Directors for approval. This is *not a formal NMFS program plan* in that it does not commit program resources, nor does it proceed through program-wide goals, objectives, and activities. The plan is intended to provide the SWFSC-SWR with guidance on annual budget priorities for the economics research fund. The plan first identifies the major research priorities and topics and then sketches out proposed economics research activities for the next 5 years.

ECONOMICS RESEARCH PRIORITIES

There are five major economics research priorities for SWFSC-SWR economists:

(1) fisheries management (domestic regulation and international agreements);

(2) habitat, trade and development, and marine mammals;

(3) fishery institutions;

(4) natural resource economics methods; and

(5) fisheries economics data.

Fisheries management, primarily through the MFCMA, has been the *central priority* for the SWFSC-SWR economics fund projects. Fisheries management research has concentrated on the groundfish fishery management plan (FMP) for the west coast and the western Pacific FMPs, although attention has also been paid to eastern tropical Pacific and South Pacific tuna fisheries. Economics research in other National Marine Fisheries Service (NMFS) program areas, such as habitat and development, has tended to be undertaken by individual economists or through contracts and grants (such as Saltonstall-Kennedy and the U.S. Army Corps of Engineers). Research into fishery institutions supports fisheries management and other NMFS program areas but is identified separately because these institutions (markets, etc.) tend to cross fishery (species) lines. Similarly, our work on natural resource economics methods is initiated because of specific analytical problems, usually in fisheries management economics research. Finally, a major topic of our research discussions is fisheries economics data which constitute an element in our research process, rather than a goal. The following sections provide more details on each of these research priorities.

FISHERIES MANAGEMENT

Domestic regulation and international agreements are the logical focus under fisheries management. To conduct fisheries management research in this area of interest, we have employed several major economics methodologies:

- optimization (bioeconomic models, static and general equilibrium analyses);
- industry behavior (cost-earnings models, linear and quadratic programming, decision modeling, economics production models);
- market demand (commercial fisheries);
- non-market valuation (recreational and habitat);
- international trade (price linkages, exchange rate effects); and

° descriptive (summaries of key economic indicators for particular fisheries, economic status reports, production studies).

Domestic fisheries management economics research is dominated by *MFCMA* priorities:[1]

West Coast

Groundfish FMP[2]	commercial and recreational
Anchovy FMP	baitfish and industrial processing
Salmon FMP	commercial, recreational, and habitat

Western Pacific

Insular FMPs (4)	commercial and recreational (bottomfish, crustaceans, pelagic species and precious corals)

International fisheries management economics research uses the same basic economics analysis methodologies. The major priorities include the following:

Albacore tuna	commercial (North and South Pacific) and west coast recreational
Pacific whiting	commercial [Canadian allocation]

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[1]At present SWFSC-SWR economists have not identified research priorities for domestic regulation of U.S. tuna resources since the costs of such research substantially exceed current capabilities. Additional resources should be identified in a cooperative tuna management research plan.

[2]Shrimp is not an FMP species, but it is a joint product in groundfish production and therefore a priority fishery for MFCMA-related economic research.

Tropical tuna	market structures, international treaties and insular fisheries interactions

Habitat, Trade and Development, and Marine Mammals

The three major areas we have identified with important economics research issues are (1) habitat, (2) trade and development, and (3) marine mammal and protected species.

Habitat issues relate to a number of specific fisheries (e.g., salmon) but also to fisheries development issues such as artificial reefs and fish aggregating devices. Their central economics methodology is the economic valuation of the impact of changes in habitat on fisheries.

Trade and development issues are connected most closely to the market structures which affect U.S. fisheries, such as groundfish and tuna. Their central economics methodologies are determination of the interaction of supply and demand, industrial organization, price formation and price linkages, and international trade theory.

Marine mammal and protected species issues are centered on the regulatory impacts of proposed projects and regulations. Their central economics methodology is the valuation of non-consumptive, non-market goods.[3]

Fishery Institutions

The primary institutional focus for our economic research is the structure of seafood markets, although the impacts of capital markets and international trade regimes are increasingly relevant. We have undertaken a number of market channel surveys and a few consumer demand studies. The SWFSC-SWR economics research fund has also supported an investigation into the opportunity cost of labor, which is integral to net economics analysis of fishing operations.

Natural Resource Economics Methodologies

The SWFSC-SWR has a good record of exploring emergent areas of natural resource economics methodologies in the context of

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[3]As in the case of economic research directed toward MFCMA management of tuna, we believe that the bulk of economics research on and evaluation of Marine Mammal Protection Act effects needs to be coordinated with existing Marine Mammal Protection Act research planning and funding.

regional problems. Examples include non-market valuation as applied to California sportfishing and non-consumptive enjoyment of whales in Hawaii; economic production modeling as applied to groundfish; international price linkages as applied to groundfish and tuna; optimal search models as applied to albacore tuna; and contestable competition as applied to Hawaii seafood markets. Many of these topics are explored with the assistance of the visiting faculty fellow program and graduate student researchers.

Fisheries Economics Data

The SWFSC-SWR economists have engaged cooperatively in three major fisheries economics data compilation efforts: the Pacific Fishery Information Network research data base currently administered by the SWR, the west coast fisheries cost-earnings data base at the La Jolla Laboratory (including a west coast fuel price index), and California recreational fisheries economics data collection. In addition, most economics research projects have involved special data collections (since most biologically oriented regular data collection omit the key economics data needs). These special economics data collections are coordinated through the semiannual meetings of the SWFSC-SWR economists and through special purpose meetings (such as on groundfish data).

SWFSC-SWR ECONOMICS RESEARCH PROJECTS 1990-95

The remainder of this plan is an outline connecting these priorities with planned, potential or hypothetical research projects in the 1990-95 period. Project details, including budgets, are not included since they are determined annually. This section concentrates on the annual allocation of the socioeconomics research fund, managed by the SWFSC. Other economic research is conducted under the regular budgets of the various programs of the SWFSC-SWR.

Actual allocation decisions are made by the SWFSC-SWR Directors, contingent on available funds. The projects are broken down into the research priority categories introduced at the beginning of this document. Ongoing research efforts are described separately. Project years are identified as FY 1990 and FY 1991 (recently completed or still ongoing), and FY 1992+ (indicating projects under consideration for the next three fiscal years). A time line of their economics research activities is identified in Table 1.

Table 1.--Time line of Southwest Fisheries Science Center and Southwest Region economics research activities, 1990-95

Categories	FY90	FY91	FY92	FY93	FY94	FY95
Applied economics			■			
West coast						
groundfish	□	■	■	■	■	■
commercial - recreational	□	■	■			
shrimp & groundfish			■			
other		■	■	■		
Western Pacific insular						
Hawaii	□	■	■			
American Samoa, Guam, Northern Marianas	■	■				
International	□	■	■	■		
Development	□	■	■	■		
Habitat	□	■				

□ Current project
■ Proposed project

Applied Economics

FY 1992

•International conference on individual transferable quotas (ITQs)

Sponsor, organize, and hold an international conference on practical experiences with ITQ management of fisheries which will produce a set of guidelines for effective development and implementation of an ITQ management program.

West Coast Commercial Groundfish

FY 1990

•Mixed integer programming model (west coast groundfish)

Ongoing faculty fellowship research.

•Gear allocation model (sablefish)

Development of programming models of sablefish fleet (including trawl, longline, and pot vessels) to solve for optimum quota allocation by gear types and to explore possible fleet responses to alternative regulations.

•Evaluation of limited entry effects

Documentation of groundfish fleet by gear and area. Document landings, revenues, vessel numbers, and industry trends.

FY 1991

•Integrated west coast groundfish economics model

Develop an integrated economics model of the west coast groundfish fisheries to assess the impact of changes in resource availability, input and output prices, public policies, management regulations, fishing patterns (modes of operation), production, and the returns from the principal species landed, along with the resulting economic gains and losses to fishermen (producers) and consumers. This model will provide vital information for formulating or amending FMPs.

•Data on joint venture whiting

Compile production data and background information on Pacific coast joint venture whiting fisheries.

•Assessing potential effects of ITQs

Develop prototype methodologies to assess the prospective benefits (and costs) of ITQs. Calculate prospective increases (or decreases) in resource rents and gains from trade (changes in economic efficiency). Evaluate potential effects upon industry structure.

FY 1992+

•Optimal allocation model

Development of bioeconomic model of the Pacific whiting fishery to investigate the economic effects of allocation of the whiting quota between onshore and off-shore processing.

•Optimal aggregation determination

Development of bioeconomic optimization models for applications of control theory to problems of optimal aggregation across space and species.

•Japanese industry production trends

Document groundfish productivity trends in Japan and how they are likely to affect Pacific coast production and markets.

•Japan groundfish export market channels

Document Pacific coast market channels for groundfish exported to Japan.

West Coast Multispecies Commercial-Recreational Fisheries

FY 1990

•Valuation of FY 1989 recreational survey

Documentation and summarization of results from the Southern California Sportsfish Economic Survey.

FY 1991

•Future projections of recreational demand

Development of behavioral models of recreational fishing demand (participation).

FY 1992+

•Postdoctorate on recreational methodologies

Investigation of economics guidelines for addressing commercial and recreational allocation issues.

West Coast Shrimp and Groundfish

FY 1992+

•Switching model

Develop discrete choice model to evaluate economic and biological factors affecting vessel switching between west coast shrimp and groundfish fisheries. Assess implications of alternative regulatory structures.

Other West Coast

FY 1991

•Status of recreational fisheries in Mexican waters

Participation in and analysis of a cooperative survey, with the Mexico Department of Fisheries, of U.S. anglers who fish in Mexican waters.

FY 1992+

•Salmon: Impact of aquaculture on fisheries management

Evaluate the economic impact of farmed salmon on the west coast commercial ocean troll salmon fisheries.

•Wetfish: Multi-species switching model

Behavioral modeling.

Western Pacific
Insular FMPs

Hawaii

FY 1989-90

- Lobster fishery bioeconomics
- Seafood market channels survey and analysis
- Bottomfish cost-earnings analysis
- Recreational valuation analysis

Ongoing research efforts.

FY 1991+

- Longline cost-earnings analysis

Basic economics cost and operating data collection and presentation in cost-earnings format.

- Pelagic fisheries interaction analysis

Integrated with Honolulu Laboratory pelagic fisheries interaction initiatives: attempt to identify economic factors affecting fishing strategies.

- General Algebraic Modeling Systems (GAMs) application to Hawaii linear programming

Extension of GAMS methodology pioneered for west coast groundfish to previous Hawaii linear programming models.

American Samoa, Guam, Northern Marianas

FY 1991+

- Guam longline fishery analysis

Basic economics cost and operating data collection and presentation in cost-earnings format.

- Small-boat fishery analysis

Analysis of previously collected data in light of new fisheries management proposals.

- Seafood market analysis

Identification of import and export seafood volume.

International

FY 1990+

•South Pacific tuna interaction project

Completed research on the geo-politics of international fisheries management.

FY 1992+

•Guam tuna transhipment model

Transportation model analysis of factors affecting Guam's location in western Pacific tuna trade.

FY 1992+

•Tropical tunas: International trade and market structure models

Extension of current international price-linkage studies.

•Tropical tunas: evaluation of South Pacific tuna treaty impacts

Methodology not yet determined.

Fisheries Development

FY 1989-91

Pacific Rim trade:

•Tuna and groundfish market integration
•Tuna and sablefish exchange rate effects

Ongoing and recently completed research.

FY 1992+

•Tuna product cycle study

•Seafood quality and inspection impacts

These studies will integrate trade models with information on production and market channels.

Habitat

FY 1990-1

•CPOP salmon habitat model

Integration of an economics evaluation model with a biophysical model of Sacramento River chinook salmon production. (CPOP-2)

FY 1991

•Habitat damage assessment methodologies

Survey and critical review of published work and methodologies on marine habitat damage assessment and assessment of economic impacts of critical habitat.

Literature Cited

Silverthorne, W., and L. Jacobson.
1991. Socioeconomic contract reserve fund: Annual Report for 1990. SWFSC LJ-91-10.